

## Redescription of *Nephopterygia austeritella* Amsel, 1965 (Pyralidae: Phycitinae) with description of its hitherto unknown female

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**Abstract.** *Nephopterygia austeritella* Amsel, 1965 (type locality: Sudan, Nubian Desert, Wadi Halfa) is redescribed. The hitherto unknown female is described based on four specimens collected in the south (provinces of Hormozgan and Fars) and the southeast (province of Sistan Va Baluchestan) of Iran. The life history of the species is described for the first time and Syrian mesquite [*Prosopis farcta* (Banks & Solander) J. F. Macbride] is newly reported as its host plant. This is also the first report of this monotypic genus from Iran.

**Résumé.** *Nephopterygia austeritella* Amsel, 1965 (localité type: Soudan, Désert de Nubie, Wadi Halfa) est redécrite. La femelle, inconnue jusqu'à présent, est décrite d'après quatre spécimens récoltés dans les parties sud (provinces d'Hormozgan et de Fars) et sud-est (province de Sistan Va Baluchestan) de l'Iran. La biologie de l'espèce est mentionnée pour la première fois et le mesquite de Syrie [*Prosopis farcta* (Banks & Solander) J. F. Macbride] est mentionné pour la première fois comme plante hôte pour l'espèce. Ce rapport présente aussi la première mention de ce genre monotypique pour l'Iran.

## Introduction

The genus *Nephopterygia* and its type species *N. austeritella* were described by Amsel (1965) based on three males collected in Sudan (Nubian Desert: Wadi Halfa), without information on life history. Later, *Nephopterygia austeritella* Amsel was reported from the Canary Islands (Fuerteventura, Jandia, Barranco Esquinzo) and Egypt (Sinai Desert: Sharm El Sheikh) (Asselbergs 2009). However, the female and life history of the species remained unknown and the genus is still monotypic.

In 2011, during a survey in Sistan Va Baluchestan province (Zabol region), signs of damage caused by pyralid larvae were detected on *Prosopis farcta* (Banks & Solander) J. F. Macbride (Fabaceae), a plant with the vernacular name of Syrian mesquite. Larvae were observed feeding in fruits and seeds, leaving tunnels through the fruit in which they pupated. After the adult moths had emerged, the males and females were compared to the known phycitine species which revealed a great similarity with male specimens of the type species of the genus *Nephopterygia*, and finally they were identified as *Nephopterygia austeritella* Amsel. Additional material was also discovered in the Hayk Mirzayans Insect Museum (HMIM) of the Iranian Research Institute of Plant Protection (IRRIP), collected in the Fars (Darab) and Hormozgan (Bandar Abbas) provinces. A redescription of the species is provided below together with a description of the female genitalia.

## Material and Methods

Genitalia dissections followed Robinson (1976). Photographs were taken using a digital still camera DSC-F717 and a Dino-Eye Microscope Eye-piece camera. Some images are the result of combining multiple images using the software Combine ZP. The terminology of wing venation follows Neunzig (1986, 1990, 1997, 2003) and the remaining terminology follows Horak (1997) and Kristensen (2003). All the material examined is deposited in the HMIM collection.

### *Nephopterygia austeritella* Amsel, 1965

Figs 1–5

**Material.** Iran: 4♂, 4♀, Sistān Va Baluchestān Prov., Zābol, Zehak (larvae on *Prosopis farcta*), 10.vi.2011, Mansour Sārāni leg.; 1♂, 1♀, Fārs Prov., Dārāb (larvae on *P. farcta*), vi.2008, Abbas Mohammadi leg.; 1♀, Hormozgān Prov., Bandar Abbās, 16.v.1975, Hāshemi, Borumand leg.

**Diagnosis.** The long, slightly curved and apically sharp pointed process originating from the inner side of the valva and extending well beyond its ventral edge (Fig. 4A), combined with the presence of only one cornutus on the vesica is characteristic for the monotypic genus *Nephopterygia* Amsel.

**Redescription.** Wingspan 16–23 mm (male), 17–22 mm (female). Forewing length (fringe included) 7.5–10.0 mm (male), 7.5–10.5 mm (female). Head (Fig. 1): frons in female with slightly appressed, dirty cream-coloured scales, appearing nearly cone-shaped (Fig. 1A), in males not clearly cone-shaped; vertex in both sexes with dirty cream-coloured appressed scales extending beyond vertex; male vertex concave between antennal sclerites, with erect and vertically positioned scales in this area (Fig. 1D). Ocelli and chaetosemata present; patagia and tegulae dirty cream-coloured. Labial palpi sexually dimorphic: male labial palpi upcurved, 2<sup>nd</sup> segment with ventrally projecting scale tuft, 3<sup>rd</sup> segment short (1/2 of second) and bare; female labial palpi porrect, 2<sup>nd</sup> segment dorsally with slightly projecting scale tuft, 3<sup>rd</sup> segment longer than in male (2/3 of second) (Figs 1A, B). Maxillary palpi short in both male and female; proboscis normally developed and scaled basally. Antennae covered dorsally with randomly arranged cream-coloured scales; basal segments sexually dimorphic: in male with long scapus more or less vertically positioned on top of vertex, mesal edge of segments 2–7 forming basal sinus and segments 4–6 with mesal spines growing gradually from 4<sup>th</sup> to 6<sup>th</sup> segments; entire sinus covered by developed scale tuft (Fig. 1D); flagellomeres with short cilia in both sexes (1/4 of antennal segment diameter); female antennae unmodified. Abdomen dirty cream coloured. Wings (Fig. 2): Male and female similar in ground colour and pattern of both fore- and hindwings; forewings elongate-subtriangular; costa straight to 2/3 of wing length, then convex towards apex; termen oblique; ground colour varying from dirty-cream with scattered light brownish scales throughout to light greyish brown; antemedian line brownish, whitish edged on the inside, extending from 1/3 on costa to middle of dorsum; postmedian line light brownish, mostly less obvious, from costa close to apex, then slightly wavy to 5/6 on dorsum; discal spot brown; fringe dirty cream-coloured to brown; hindwings dirty cream-coloured with darker suffusion at all margins, especially at apex and costa; fringe dirty cream-coloured with a basal brown line. Wing venation (Fig. 3): Forewing with  $R_{3+4}$  and  $R_5$  with long common

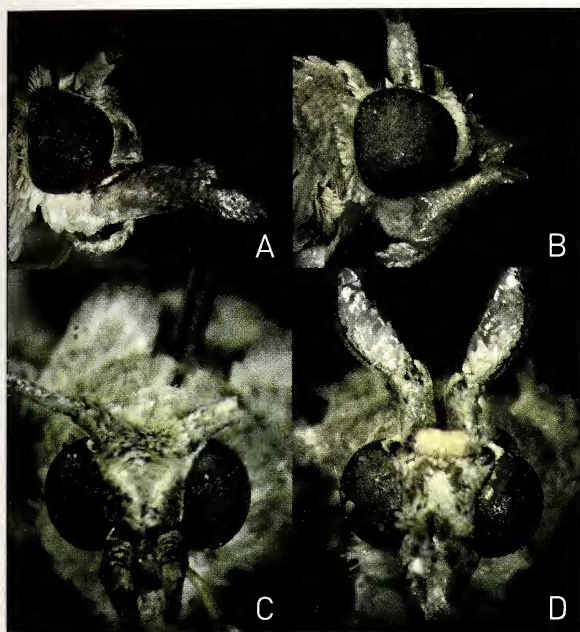


Fig. 1. Head, female (A) and male (B) in lateral view; female (C) and male (D) in frontal view.

stalk;  $M_2$  and  $M_3$  with short common stalk. Hindwing characteristically of quadrifid type.

**Male genitalia** (Figs 4A–C). Uncus a flat elongate trapezoid with dense short setae dorsally, without medial indentation at apex. Gnathos small and oval. Valva elongate, of moderate width, costa moderately sclerotised; saccular side of valva with prominent evagination; sacculus prominent and sclerotised basally; cucullus rounded. Each valva with a slightly curved and apically pointed sclerotised process originating at middle of inner side having slightly less than  $1/2$  length of valve (Fig. 4A). Juxta U-shaped with a pair of small flap-like processes. Vinculum almost flat basally and slightly less than the length

of valvae. Transtilla paired. Phallus stout, broad and slightly shorter than valva; vesica with numerous granulations and a stout cornutus of about  $2/5$  of the length of phallus. Culcita with median distally bifurcated plate of variable length; ventral edge of 8<sup>th</sup> segment flatly dish-shaped with paired tapering lateral plates; two long scale bundles extending from each side of base to just beyond apex of plate.

**Female genitalia** (Figs 4D–H). Papillae anales subtriangular. Ostium broad, antrum sclerotised, and ductus bursae as a very well-defined, sclerotised tube. Ductus bursae relatively long, as long as corpus bursae, sclerotised and folded over itself at about  $2/3$ . 8<sup>th</sup> abdominal segment longer than broad, posterior margin straight. Apophyses posteriores slightly longer than apophyses anteriores. Corpus bursae an inverse trapezoid, with distal wall clearly invaginated and with some irregular swellings near distal end; ductus seminalis originating from distally protruding area of corpus bursae. Signa developed as two spiny plates, one of them an elongated oval plate with inwardly directed spinules in invaginated distal wall of corpus bursae (Figs 4E, G), the other one larger, circular, with conspicuous larger spines directed inwardly (Fig. 4G).

**Life history.** In both Sistan Va Baluchestan (Zabol) and Fars (Darab) provinces, the females lay their eggs on the green fruits of *Prosopis farcta* in May. The eggs hatch in June, then the larvae feed on the fruit pericarps and make tunnels within the fruit (Fig. 5). They also feed on the seeds. The adults emerge in July. In all probability, *P. farcta* is the only host plant of *N. austeritella* in Iran although other food plants are not excluded. As far as we know, *Prosopis farcta* is distributed in Algeria, Egypt, Tunisia, Saudi Arabia, Palestine, Israel, Jordan, Lebanon, Syria, Cyprus, Turkey, Afghanistan,



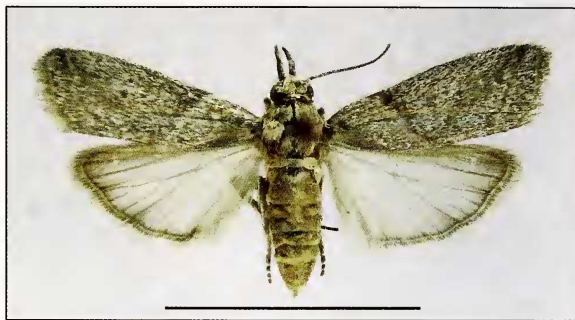
Iran, Iraq, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan, India, and Pakistan (USDA, ARS 2012). As *N. austeritella* is also known from Sudan and the Canary Islands, either the only known food plant occurs there as well, or the species is not monophagous.

**Distribution.** This species has a disjunct distribution. It is reported from the most western part of the Sahara-Arabian subregion of the Palaearctic region (Canary Islands) and its eastern parts (Egypt) (Amsel 1965; Asselbergs 2009). It is also reported from the East African subregion of the Afro-Tropical region (Sudan) (Amsel 1965), and now from Iran, which is positioned in the Turanian-Persian subregion of the Palaearctic region.

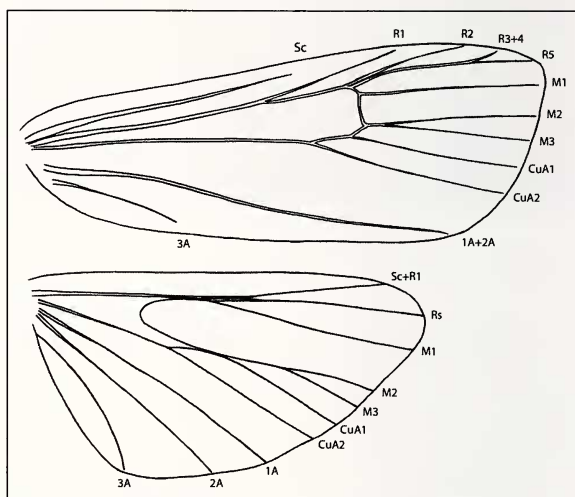
**Remarks.** This is the first report of *Prosopis farcta* as a host plant for *Nephopterygia austeritella* and this phycitine taxon is newly reported from Iran. *Nephopteryx* Zeller, 1839 is an incorrect subsequent spelling and an incorrect authorship of *Nephopterix* Hübner, (1825) of which the type species is *Tinea* (= *Nephopterix*) *angustella* Hübner, 1796 (Fletcher & Nye 1984). Most of the information on species of *Sciota* has appeared in the literature under the name of *Nephopterix* Hübner (or *Nephopteryx*, an unjustified emendation). This occurred as a consequence of Heinrich (1956) and others, erroneously considering *Phycita rhenella* Zincken to be the type species of *Nephopterix* (Fletcher & Nye 1984). Palm (1986), Speidel (1996) and Leraut (1997) have moved the Palaearctic species with the features of *P. rhenella* to *Sciota*. Neunzig (2003) placed the North American species under *Sciota* as well.

## Discussion

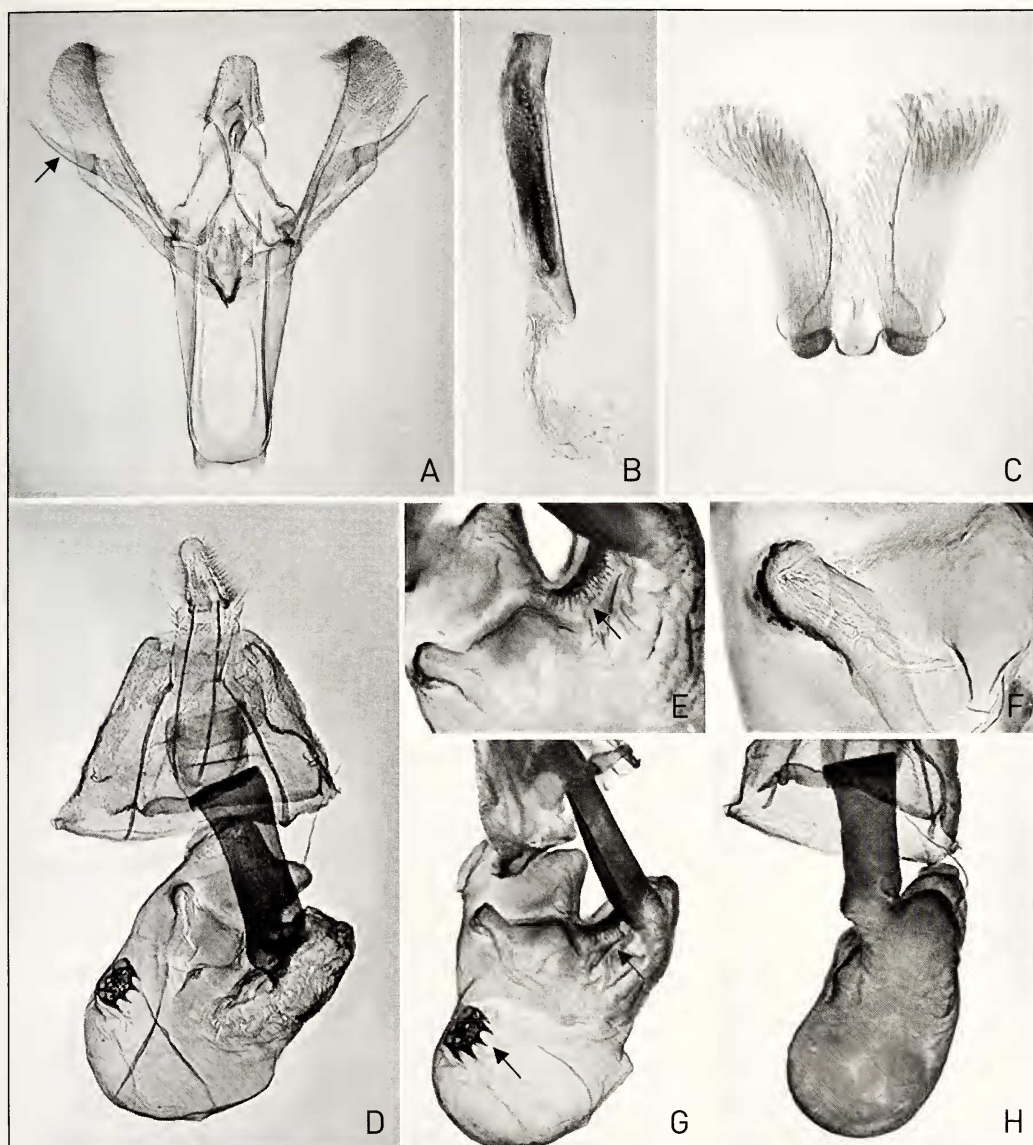
The disjunct distribution of *Nephopterygia austeritella* is not at all uncommon as can be illustrated by the following other phycitine examples: *Caina deletella* Ragonot is



**Fig. 2.** *Nephopterygia austeritella* Amsel female. Scale = 10 mm.



**Fig. 3.** Fore- and hindwing of *Nephopterygia austeritella* Amsel female.



**Fig. 4.** Male (A–C) and female genitalia (D–H), D and H frontal and dorsal views, G lateral view.

distributed in the Canary Islands, the United Arab Emirates, South Iraq, and India; *Cherchera abatesella* Dumont is known from Tunisia, Malta, and the United Emirates; and *Pempeliella malacella* (Staudinger) is known from South Spain, Egypt, and the United Arab Emirates (Asselbergs 2007, 2010).

These disjunctions can be explained either by the insufficiently explored areas in between or by the absence of proper biotopes. *Nephopterygia austeritella* can probably be considered a southern Palaearctic faunal element which enters the northern parts of the Afro-Tropical region. This distribution seems to be similar to that of its host plant, *Prosopis farcta* (USDA, ARS 2012).





Fig. 5. *Prosopis farcta* (Banks & Solander) J. F. Macbride (A); damaged fruit (B).

Comparing the male genitalia of *N. austeritella* with those of the Old World triline (Roesler 1973) and quadridline Acrobasiina (part) (Roesler 1993) and with the Nearctic Phycitinae (Heinrich 1956), does not reveal many evident similarities. The same applies to the female genitalia. There is a certain similarity between the male genitalia of *Nephopterygia* and those of a few species of the Palaearctic *Sciota*, such as *marmorata* Alphéraky and, to a lesser degree, *fumella* Eversmann, because they all share a long process originating from the inner side of the valva.

While the genus *Nephopterix* Hübner, (1825) (= partly *Sciota* Hulst, 1888) seems to be related to *Nephopterygia*, it differs from the latter by the presence of two cornuti on the vesica, the differently sclerotised and unfolded ductus bursae, the lack of a signum in the bursa, and the presence of three scale tufts bilaterally on the 8<sup>th</sup> sternite. In addition, the 2<sup>nd</sup> segment of the labial palpus in the female appears to be much broader than in *Sciota*. Therefore, even including the description of the female cannot reveal a closer relationship with any of the other known genera of the subtribe Acrobasiina. At present it seems best to maintain the monotypic genus *Nephopterygia* in its rather isolated position.

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